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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT CD NO

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SUBJECT

Cormanium Transistor Development at VEB Work fuer Baumlemente der Nachrichtentechnik, Teltor NO. OF PAGES

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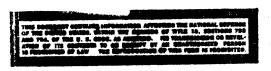
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SUPPLEMENT REPORT NO.

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THIS IS UNEVALUATED INFORMATION

- 1. Through application of the Bridgeman method for the making of pure germanium monocrystals, VEB Werk fuer Baulemente der Nachrichtentechnik, Carl von Ossietzky (formerly Dralowid), in Teltow, has succeeded in producing crystals with a degree of purity of 40 ohm centimeters. 25X1 Samples of point-contact transistors made from these crystals during the development process have an sutput amplification up to 1,000, with a voltage amplification amounting to several hondred. During October and November 1954, the Dralowid transistor development team under the supervision of Dr. Mathias Falter, assisted by mathematicianG. Ranks and physicist Blankenburg (fnu), succeeded in further improving the purity of the germanium monocrystals obtained through the application of the Bridgeman method. The maximum degree of purity reached as 25X1 of mid-November 1954 was 55 ohm centimeters.
- During the fall of 1954, the Dralowid plant started to build an install tion for the application of the "zone melting procedure" (Zonenschmel.verfanren) for the purification of germanium. However, the Dralowid development team digressed in one important essential from this method. The essential feature of this procedure consists of melting germanium monocrystals gradually; the monocrystals are not contained in crucibles during the process, to avoid the diffusion of impurities from the walls of the crucible into the germanium. The Dralowid plant, however, used a quartz container called a Schiffohen, shaped like half of an oblong half tube (i.e. a tube halved along its longitudinal axis). The germanium was put into this half tube and the Schiffchen with its germanium contents was placed in a larger quartz tube. This quartz tube was surrounded by induction coils of two windings each; the coils were at intervals of 10 centimeters from each other. There were four or five coils. The coils were heated by a transmitter and the quartz tube with the Schiffchen inside it was moved horizontally at a slow speed within the coils. In this way, the germanium was melted and purified. It developed that the purified germanium still contained too many silicon impurities from the quartz, because the sigicon impurity ratio (the number of impurities in crystallized germamum in relation to their number in molten germanium), is greater than 1. As soon as this mistake was realized, the Dralowid team decided to apoly the Tone melting procedure in its original version. In this version,

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the germanium is moved through melting zones without being put into a container, and thus without being exposed to container impurities. This improved version of the zone melting procedure, however, had not been yet started because the transmitter for the induction heating broke down in early November 1954 and was undergoing repairs.

- The Dralowid team also completed an installation for the application of the Czrochalsky method for the purification of germanium. The first results obtained were germanium monocrystals of 10 centimeter length with a diameter of 5 millimeters. hese crystals, however, did not have straight shapes but were rather uneven in thickness due to bac temperature control. The degree of purity did not exceed the degree of purity of the best samples obtained through the application of the Bridgeman method. The experiments with the Czrochalsky installation were to be continued as soon as the transmitter for induction heating (a 3.5 km line) (lightheader) was repaired. It is hoped that through improvement of the fresent Czrochalsky installation more homogenous crystals can be obtained than through application of the Bridgeman method. The highest purity obtained with the Bridgeman method is found well inside the germanium crystals its outer layers have varying degrees of impurity.
- 4. Production of point-contact germanium transistors was to be started in early 1955. The Dralowid plant had received positive assurance from the State Planning Commission that the necessary funds would be made available.
- 5. No essential progress had been made as yet by Falter's team in the development of junction-type germanium transistors. The plan for this development provided that it should be completed by the end of 1955.



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